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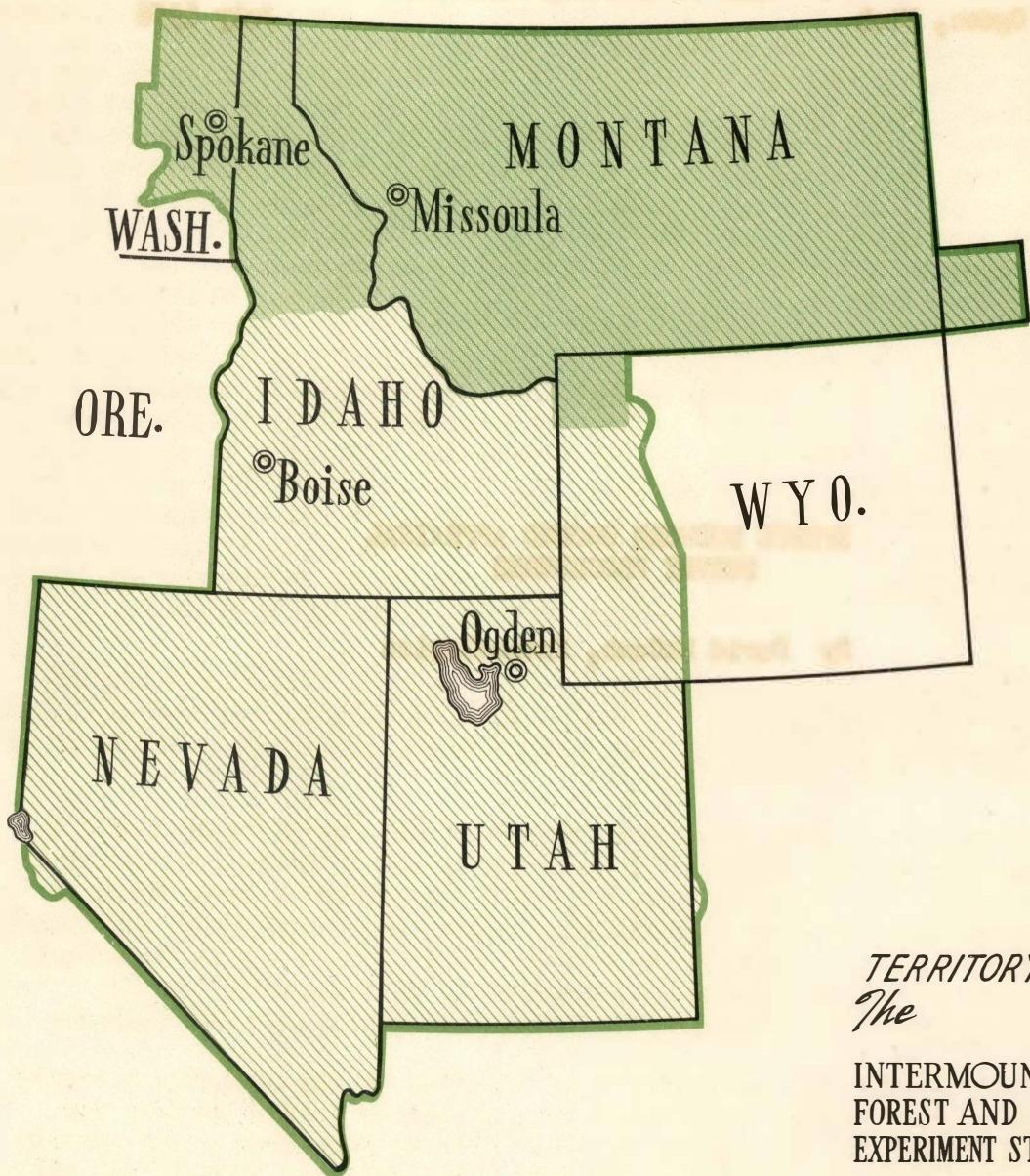
July 1956

SPRUCE BUDWORM GROUND APPRAISAL
SURVEY PROCEDURES

By David McComb, Entomologist

Prepared By The
Forest Insect Laboratory
Missoula, Montana

The AREA COVERED BY THIS REPORT



TERRITORY OF..
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INTERMOUNTAIN
FOREST AND RANGE
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The MISSOULA FOREST INSECT LABORATORY
is a field unit of the Intermountain Forest and Range Experiment Station at Ogden, Utah. The Laboratory conducts forest insect research, surveys forest insect outbreaks, and gives technical advice on cooperative insect control programs in Montana, northwestern South Dakota, northwestern Wyoming, northern Idaho, and northeastern Washington.

The functions are conducted in the remaining station territory by staff entomologists at Ogden, and Boise, Idaho.



SPRUCE BUDWORM GROUND APPRAISAL
SURVEY PROCEDURES

This guideline has been prepared to facilitate the completion of the spruce budworm appraisal survey being made by the Intermountain Forest and Range Experiment Station on federal, state, and private timberlands in Forest Service Region One during August and September 1956. The survey will utilize aerial and ground examinations to determine the extent and severity of spruce budworm infestations which by last year had spread over 3,100,000 acres in the Region. The aerial phase of the survey will be done by the Missoula Forest Insect Laboratory of the Intermountain Station, the ground phase by (1) national forest personnel supervised by the Division of Timber Management, R-1, using the procedures hereinafter described and (2) by Laboratory personnel. Analysis of data will be by the Missoula Forest Insect Laboratory. These guidelines will help to insure uniformity in survey objectives, terminology, and procedures. They have been modified in some instances to apply to certain budworm infestation characteristics manifested this year. Since some of these characteristics have not heretofore been experienced in the Region, it is anticipated that some of the ground survey procedures recommended here may have to be further adapted to local infestation conditions if the objective of the budworm appraisal survey is to be realized. Such adaptation by the survey field personnel are encouraged, but their entomological soundness should receive the approval of the Laboratory before they are extensively used.

The objective of this survey is to locate and delineate those areas of significant spruce budworm defoliation in Forest Service Region One, where aerial surveys are unable to definitely establish portions of the boundary of such defoliation.

Commencing on August 1st aerial surveys of all known spruce budworm defoliation in the Region will be flown by the Missoula Forest Insect Laboratory. On these surveys, maps will be marked to show areas of heavy, medium and light defoliation. Where the boundary of the lightly defoliated area is adjacent to budworm host type it may be necessary to carry on ground surveys to determine if this boundary has been placed properly to delineate the margin of significant defoliation.

When the Laboratory determines that a sector of the aerially surveyed boundary of a lightly defoliated area should be ground checked for proper placement, the ground surveyor will be furnished a map clearly marked to show the sector in question. In addition, Form SBW 20 will be provided for the recording of ground survey data. Original copies of this completed form, along with the original map, shall be sent to the Missoula Forest Insect Laboratory as soon as the assignment is completed.

Data collected from budworm defoliation plots, made throughout the questionable boundary areas and recorded on Form SBW 20, will serve as an aid to the surveyor in placing his boundary and will also indicate to the Laboratory that the progress of boundary delineation is progressing as planned.

Budworm defoliation plots will be established at a minimum of one to each township section in questionable boundary areas with more being established when manpower and travel time permit. At least three plots shall be established for any one boundary checking assignment. The method to be used in establishing and recording the data from each budworm defoliation is as follows:

1. In the small block labelled "Map Number" in the upper right corner of Form SBW 20 place the number of the aerial survey map received with the boundary checking assignment.
2. Indicate the plot number in column 1 of the form. Show the location of the plot on the map, using the encircled plot number as a location symbol. The defoliation plots will be serially numbered beginning with number 1 for each numbered aerial survey map.
3. In column 2 of Form SBW 20 record the approximate percentage of host type in the overstory in the immediate vicinity of the plot. See "Terminology" for definition of host type.
4. In columns 3 and 4 of the form record the approximate percentage of Douglas-fir and true fir stems in the overstory.
5. In column 5, using tree species symbols, record the dominant tree species in the understory. If no understory is present, indicate none.
6. Select five host type trees at random on the plot. Examine 20 new (1956) foliage growth tips on each tree, five each from four twigs, for any evidence of budworm feeding. From this total of 100 new growth tips record in column 6 the number of tips showing any budworm feeding. Examine only 20 tips on each tree and only 5 trees so that the total number of tips fed upon will also be the percentage of defoliation during the last (1956) larval feeding.
7. Make a rapid visual examination of 1954 and 1955 budworm feeding on the same trees from which the tip counts were made and record this defoliation as heavy, medium or light in column 7.
8. The plot surveyor's name and the date the plot was surveyed should be entered in columns 8 and 9 respectively.
9. Enter data for additional plots in the same boundary sector on succeeding horizontal lines on Form SBW 20.

If questionable boundary sectors are to be checked adjacent to non-host type or parks larger than 100 acres, they should be outlined and marked on the map; "NH" for non-host type or "OP" for open parks. Areas smaller than 100 acres should be sampled on the side distant from the aerially mapped defoliated area to determine if 1956 defoliation has occurred and, if so, how far from the mapped area.

After recording the data from the budworm defoliation plots, sketch in non-host types on the aerial survey map. The surveyor should either confirm the boundary location as mapped from the air or draw on the map the revised location as indicated by the plot examinations, making sure the revised boundary passes through the defoliation boundary zone. See "Terminology" for definition of defoliation boundary zone. All boundary line additions should be made an integral part of the aerial survey boundaries.

Terminology Used in the 1956 Spruce Budworm Ground Appraisal Survey

The following definitions of terms to be used by the Missoula Forest Insect Laboratory in survey guidelines, report forms, and survey summaries are given so that all personnel connected with these surveys may have a clear understanding of their meaning. Many of these definitions presumably are not technically adequate, but they are defined as they will be used in the 1956 survey.

DEFOLIATION--partial or complete loss of foliage resulting from budworm feeding.

GROWTH TIPS--small terminal twigs resulting from development of this year's buds.

HOST TYPE--Douglas-fir and true fir stands in excess of fifteen percent of the total number of all trees in the overstory. Stands with a heavy understory of fir may be classed as host type if at least ten percent of the overstory is fir type.

STAND--an aggregation of trees occupying a specific area and sufficiently uniform in composition (species), age, arrangement and condition as to be distinguishable from the forest or other growth on adjoining areas.

OVERSTORY--that portion of the tree in a forest stand forming the upper crown cover.

UNDERSTORY--that portion of the trees in a forest stand below the over-story.

DEFOLIATION BOUNDARY ZONE--an area of host type through which the defoliation boundary will pass. An area where the severity of defoliation drops from light to an insignificant amount, namely the zone around a defoliated area where only 25 to 40 percent of the new growth tips have been fed upon during the last larval feeding period.

LARVAL FEEDING PERIOD--the period after the second instar larvae break hibernation until they pupate; in Region One generally between late May and August 1.

DOMINANT--a species which characterizes the community in its larger aspects, usually preponderant either numerically or in mass effect.

BUDWORM FEEDING--any loss of foliage, either entire needles or parts of needles removed by the budworm for food. Not to be confused with deformed or off-color needles caused by disease or weather.

DEGREE OF DEFOLIATION SEVERITY:

LIGHT--Aerial surveys; budworm defoliation in the upper one-eighth of crown barely visible to visible.

Ground surveys; that area in which from twenty five to fifty percent of the new growth tips have been fed upon during the last larval feeding period.

MEDIUM OR MODERATE--Aerial surveys; defoliation visible throughout the upper one-quarter of the tree crown.

Ground surveys; that area in which fifty one to seventy four percent of the new growth tips have been fed upon during the last larval feeding period.

HEAVY--Aerial surveys; areas with more than one quarter of the tree crown visibly damaged.

Ground surveys; that area in which over seventy five percent of the new growth tips have been fed upon during the last larval feeding period.

[Redacted]
Map. No.

Spruce Budworm Ground Appraisal Survey Record

DEFOLIATION PLOT DATA

| Plot number | Overstory, % | | True fir | Under-story type | % Defol. buds | Past damage | Surveyor | Date |
|-------------|--------------|-----------|----------|------------------|---------------|-------------|----------|------|
| | Host type | Doug. fir | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Remarks:

Approved: _____

Title: _____

Return to:

Missoula Forest Insect Laboratory

Date: _____